Electronic Version
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Claims

[c1] 1.A sub-reflector assembly for a reflector antenna with a waveguide supported sub-reflector, comprising:
a dielectric block;
the dielectric block having a first diameter waveguide junction portion adapted for coupling to an end of the waveguide;
a sub-reflector surface coated with an RF reflective material having a periphery at a second diameter larger than the first diameter; and
a leading cone surface extending from the waveguide junction portion to the second diameter at an angle;
the sub-reflector surface and the leading cone surface having a plurality of non-periodic perturbations concentric about a longitudinal axis of the dielectric block.

[c2] 2.The assembly of claim 1, wherein the perturbations include ridges and or grooves of varied width and height.

[c3] 3.The assembly of claim 1, wherein the waveguide junction portion coupling is via insertion into an end of the waveguide.

[c4] 4.The assembly of claim 1, wherein the waveguide junc-

tion portion has at least one groove and at least one step

[c5] 5.The assembly of claim 1, further including at least one radial corrugation in the periphery.

[c6] 6.The assembly of claim 1, wherein the angle is a first angle between the waveguide junction portion and a first location along the leading cone surface and a second angle from the first location to the periphery.

[c7] 7.The assembly of claim 1, wherein the perturbations are adapted to create a desired phase correction to a radiation pattern of the sub-reflector.

[c8] 8.The assembly of claim 1, wherein the perturbations are adapted to create a desired amplitude correction to a radiation pattern of the sub-reflector.

[c9] 9.The assembly of claim 1, wherein the perturbations are adapted to create a desired radiation pattern that is different between a vertical and a horizontal polarized portion of the radiation pattern.

[c10] 10.The assembly of claim 1, wherein the perturbations are adapted to enable a desired radiation pattern over a range of frequencies, when the sub-reflector is mated with a single deep dish reflector configuration.

[c11] 11.The assembly of claim 1, wherein the range of fre-

quencies is a desired frequency band within 10 to 60 Gigahertz.

[c12] 12.A method for forming a sub-reflector for a deep dish reflector antenna, comprising the steps of:
-injection molding a dielectric block;
-machining the dielectric block; and
-coating a sub-reflector surface of the dielectric block with an RF reflective material;
the dielectric block having a plurality of non-periodic perturbations, the perturbations selected to create a desired RF pattern distribution.

[c13] 13.The method of claim 12, wherein the perturbations have varied heights, depths and widths.

[c14] 14.The method of claim 12, wherein the plurality of non-periodic perturbations are located on the sub-reflector surface and a leading cone surface extending between the sub-reflector surface and a waveguide junction portion.

[c15] 15.The method of claim 12, wherein the plurality of non periodic perturbations are calculated using a full wave solution.

[c16] 16.The method of claim 15, wherein the calculation is performed using an RF wave modeling software pro-

gram.

[c17] 17.A sub-reflector assembly for a reflector antenna, comprising:
a block of dielectric material with a waveguide junction portion adapted for insertion into a waveguide mounted proximate the vertex of the deep dish reflector;
the dielectric block extending from the waveguide junction portion, over a leading cone surface, to a periphery of a sub-reflector surface;
the sub-reflector surface coated with an RF reflective material;
the leading cone surface and the sub-reflector surface having a plurality of concentric, non-periodic perturbations.

[c18] 18.The assembly of claim 17, wherein the perturbations are a plurality of grooves and ridges having a range of different heights, widths and or depths.

[c19] 19.The assembly of claim 17, wherein the perturbations form a radiation pattern adapted for a profiled deep dish reflector.

[c20] 20.The assembly of claim 19, wherein the radiation pattern is different for a vertical and a horizontal polarized component of the radiation pattern.

[c21] 21.The assembly of claim 19, wherein the radiation pattern is adapted for operation over a desired range of frequencies.

[c22] 22.The assembly of claim 21, wherein the desired range of frequencies is a frequency band within 10 to 60 Gigahertz.